

What is claimed is:

1. A method for identifying one or more complexes from a library of complexes, wherein said complex or complexes are selected for their ability to perform a preselected or desired function on a target molecule or by having a preselected structure, each complex being designated a morphatide, said method comprising:
  - (a) preparing a library of morphatides, comprising:
    - (i) a scaffolding component selected from the group consisting of nucleic acid, nucleic acid like molecule or nucleic acid analog having one or more regions of randomized sequence;
    - (ii) one or more linker components; and
    - (iii) one or more agent molecules or type of agent molecules, linked to the scaffolding component by one or more type of linker components, wherein at least one of said agent molecules is selected from the group consisting of nucleic acid, nucleic acid like molecule or nucleic acid analog; and
  - (b) screening the library of morphatides prepared in step (a) by contacting, binding, or associating the morphatides with one or more suitable target molecules upon which a morphatide performs a preselected or desired function or to which a morphatide binds or associates through a pre-selected structure of said morphatide under conditions permitting said morphatide to perform said preselected or desired function on said target molecules or permitting said morphatide to bind or associate with said target molecules through the preselected structure;
  - (c) separating the morphatides performing the preselected or desired function or binding or associating through the preselected structure, from the library of morphatides and target molecules; thereby identifying one or more



preselected structure, from the library of morphatides and target molecules; thereby identifying one or more complexes from a library of complexes, wherein said complex or complexes are selected for their ability to perform a preselected or desired function on a target molecule or by having a preselected structure.

3. The method of claim 1, wherein one or more of said linker components are reversible.
4. The method of claim 1, wherein one or more of said linker components cannot be amplified in vitro or in vivo.
5. The method of either of claims 1 or 2, wherein one or more of said scaffolding components associated with one or more of said linker components is amplifiable in vitro or in vivo.
6. The method of claim 1, wherein said one or more of said linker components connected to one or more of said agent molecules cannot be amplified in vitro or in vivo.
7. The method of claim 1 or 2, wherein the entire morphatide is amplifiable.
8. The method of claim 1, wherein the linker component is selected from the group consisting of a phenyl-boronic acid linker, a thio linker, and a biotin-streptavidin linker.
9. The method of claim 8, wherein the thio linker is cysteine.
10. The method of either of claims 1 or 2, said method further comprising after step (b):

- (a) disassociating the scaffolding component of the complex performing the preselected or desired function from the agent molecule or molecules;
  - (b) generating modified scaffolding components;
  - (c) associating the different scaffolding molecules with agent molecules to generate different morphatides;
  - (d) rescreening the different morphatides by repeating steps (b) and (c) of claims 1 or 2 to identify new desired candidate morphatides.
11. The method of claim 10, wherein said modification of scaffolding components occurs via a random or directed mutagenesis technique.
12. The method of claim 11, wherein said random or directed mutagenesis techniques are selected from the group consisting of error-prone PCR or sexual PCR by performing a suitable number of cycles on the scaffolding components, resulting in one or more base changes in some percentage of the scaffolding components; cassette mutagenesis; and site directed mutagenesis.
13. The method of claim 10, wherein one or more of said agent molecules in step (c) are different from the agent molecules utilized in the morphatides of the prior round of screening for identification of morphatides performing the preselected or desired function.
14. The method of either of claims 1 or 2, for identifying a different morphatide further comprising:
- (a) separating the scaffolding components from the agent molecules;
  - (b) performing a suitable number of cycles of error prone PCR on the scaffolding components, resulting in one or more

base changes in some percentage of the scaffolding component;

(c) reconnecting the scaffold component to the agent component; and

(d) repeating steps (a) through (d) of claims 1 or 2, thereby identifying a different morphatide.

15. The method of claim 10, wherein the morphatide comprises a linker component, wherein in step (a) one part of a linker remains attached to the scaffold component and another part of the linker remains attached to the agent molecule and wherein in step (c) both parts of the linker are connected, thereby reconnecting the scaffold component to the agent component or wherein the connection between the agent molecule and the scaffolding component is by a plurality of the linker components.

16. The method of either of claims 1 or 2, further comprising:

(a) separating scaffolding components with attached linker components or parts of the linker components from the agent molecules of the previously identified Morphatides;

(b) combining the scaffolding components with attached linker components or parts thereof with scaffolding components comprising a same nucleic acid sequence as the scaffolding components, said nucleic acid sequence not being attached to or associated with a linker components or parts thereof, thereby resulting in nucleic acid sequences, without the one or more linker sites;

(c) using sexual PCR to fragment and reassemble the nucleic acid sequences, resulting in elimination of linker component sites which do not contribute to the binding of the morphatide, thereby generating new scaffolding components similar but not identical to the scaffolding components of step (a);

(d) reattaching or association agent molecules to the new scaffolding components of step (c), thereby generating another set of Morphotides.

17. A morphatide identified by the method of claim 1.
18. A composition comprising the morphatide of claim 17 effective to treat a subject and a pharmaceutically acceptable carrier.
19. The morphatide of claim 17, conjugated to a therapeutic agent.
20. The morphatide of claim 19, wherein the therapeutic agent is a radioisotope, toxin, toxoid, or chemotherapeutic agent.
21. A composition comprising the conjugated morphatide of claim 19 and a pharmaceutically acceptable carrier, wherein the morphatide is selected from either a morphatide which is capable of being degraded or a morphatide which is incapable of being degraded after administration to a subject.

MORPHATIDES - NOVEL SHAPE AND STRUCTURE LIBRARIES

ABSTRACT OF THE DISCLOSURE

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This invention provides a method for identifying one or more complexes from a library of complexes, wherein said complex or complexes are selected for their ability to perform a preselected or desired function on a target molecule or by having a preselected structure, each complex being designated a morphatide, said method comprising: (a) preparing a library of morphatides, comprised of: (i) a scaffolding component selected from the group consisting of nucleic acid, nucleic acid like molecule or nucleic acid analog having one or more regions of randomized sequence; (ii) one or more linker components; and (iii) one or more agent molecules or type of agent molecules, linked to the scaffolding component by one or more type of linker components; and (b) screening the library of morphatides prepared in step (a) by contacting, binding, or associating the morphatides with one or more suitable target molecules upon which a morphatide performs a preselected or desired function or to which a morphatide binds or associates through a pre-selected structure of said morphatide under conditions permitting said morphatide to perform said preselected or desired function on said target molecules or permitting said morphatide to bind or associate with said target molecules through the preselected structure; (c) separating the morphatides performing the preselected or desired function or binding or associating through the preselected structure, from the library of morphatides and target molecules; thereby identifying one or more complexes from a library of complexes, wherein said complex or complexes are selected for their ability to perform a preselected or desired function on a target molecule or by having a pre-selected structure.